AMENDMENTS TO THE CLAIMS

This listing of claims will replace all prior versions and listings of claims in the application:

LISTING OF CLAIMS:

1. (previously presented): A liquid-jet head characterized by comprising a channel substrate which has pressure generation chambers formed therein and communicating nozzle orifices for discharging liquid droplets; and piezoelectric elements each of which is composed of a lower electrode, a piezoelectric layer, and an upper electrode and which are disposed on one surface of the channel substrate via a vibration plate, wherein at least pattern regions of the respective layers which constitute the piezoelectric elements are covered with an insulating film formed of an inorganic amorphous material.

2. (previously presented): The liquid-jet head according to claim 1, wherein the amorphous material is aluminum oxide ($A1_2O_3$).

3. (previously presented): The liquid-jet head according to claim 2, wherein the insulating film has a thickness of 30 to 150 nm.

4. (previously presented): The liquid-jet head according to claim 2 , wherein the insulating film has a film density of 3.08 to 3.25 g/cm^3.

5. (previously presented): The liquid-jet head according to claim 2 , wherein the insulating film has a Young's modulus of elasticity of 170 to 200 GPa.

6. (previously presented): The liquid-jet head according to claim 1 , wherein the sum of stress of the insulating film and stress of the upper electrode is compressive.

7. (previously presented): The liquid-jet head according to claim 6, wherein stress of the insulating film and stress of the upper electrode are each compressive.

8. (previously presented): The liquid-jet head according to claim 7, wherein the upper electrode is formed of at least Pt.

9. (previously presented): The liquid-jet head according to claim 6, wherein stress of the insulating film is compressive, and stress of the upper electrode is tensile.

10. (previously presented): The liquid-jet head according to claim 9, wherein the upper electrode is formed of at least Ir.

11. (previously presented): The liquid-jet head according to claim 9, wherein stress δ of the upper electrode and that of the insulating film are each represented by the product (ε x Y x m) of Young's modulus of elasticity Y, distortion ε, and film thickness m, and stress δ_1 of the upper electrode and stress δ_2 of the insulating film satisfy the condition $|\delta_1| < |\delta_2|$.

12. (previously presented): The liquid-jet head according to claim 1, further comprising an upper-electrode lead electrode extending from the upper electrode, wherein at least pattern regions of the respective layers which constitute the piezoelectric elements and the upper-electrode lead electrode are covered with the insulating film, except for regions facing connection portions of the lower electrode and the upper-electrode lead electrode, the connection portions being used for connection with connection wiring.

13. (previously presented): The liquid-jet head according to claim 12, wherein the upper-electrode lead electrode is formed of a material containing aluminum as a predominant component.

14. (previously presented): The liquid-jet head according to claim 12, further comprising a lower-electrode lead electrode extending from the lower electrode, wherein the lower electrode is connected to the connection wiring via the lower-electrode lead electrode, and the pattern region containing the lower-electrode lead electrode is covered with the insulating film, except

for regions of the upper-electrode lead electrode and the lower-electrode lead electrode facing the connection wiring.

15. (previously presented): The liquid-jet head according to claim 12, wherein the upper electrode and the upper-electrode lead electrode are formed of different materials.

16. (previously presented): The liquid-jet head according to claim 12, wherein the piezoelectric layer and the upper electrode of each piezoelectric element extend to the outside of a region facing the corresponding pressure generation chamber so that a piezoelectric non-active portion is formed, and an end portion of the upper-electrode lead electrode on the side toward the upper electrode is located on the piezoelectric non-active portion and outside the pressure generation chamber.

17. (previously presented): The liquid-jet head according to claim 12, wherein in a state in which the connection wiring is connected, the connection portions are covered with a sealing material formed of an organic insulating material.

18. (previously presented): The liquid-jet head according to claim 12, wherein the insulating film includes a first insulating film and a second insulating film, the piezoelectric elements are covered by the first insulating film except for the connection portion for connection with the upper-electrode lead electrode, the upper-electrode lead electrode is provided on the first insulating film, and at least the pattern regions of the respective layers which constitute the piezoelectric elements and the upper-electrode lead electrode are covered with the second insulating film except for regions facing the connection portions.

19. (previously presented): The liquid-jet head according to claim 12, wherein the connection wiring includes a second upper-electrode lead electrode extending from the upper-electrode lead electrode, the second upper-electrode lead electrode is provided on the insulating

film and is connected to the upper-electrode lead electrode at the connection portion, and a terminal portion to which drive wring is connected is provided at a tip end portion of the second upper-electrode lead electrode.

20. (previously presented): The liquid-jet head according to claim 12, wherein the piezoelectric layer and the upper electrode of each piezoelectric element extend to the outside of a region facing the corresponding pressure generation chamber so that a piezoelectric non-active portion is formed, and an upper-electrode-side end portion of the upper-electrode lead electrode which is connected to the upper electrode is located on the piezoelectric non-active portion and outside the pressure generation chamber.

21. (previously presented): The liquid-jet head according to claim 12, wherein a protective plate having a piezoelectric-element-holding portion, which is a space for protecting the piezoelectric elements, is bonded to a surface of the channel substrate, the surface being located on the side toward the piezoelectric elements, and the connection portion of the upper-electrode lead electrode is provided outside the piezoelectric-element-holding portion.

22. (previously presented): The liquid-jet head according to claim 1, wherein a protective plate having a piezoelectric-element-holding portion, which is a space for protecting the piezoelectric elements, is bonded to a surface of the channel substrate via an adhesive layer, the surface being located on the side toward the piezoelectric elements, the protective plate includes a flow passage for liquid to be supplied to the pressure generation chambers, the adhesive layer located on the flow passage side of the piezoelectric-element-holding portion is exposed to the interior of the flow passage, and a moisture permeable portion which enables permeation of water within the piezoelectric-element-holding portion is provided in a region other than the flow passage side of the piezoelectric-element-holding portion.

23. (previously presented): The liquid-jet head according to claim 22, wherein the moisture permeable portion is formed of an organic material.

24. (previously presented): The liquid-jet head according to claim 22, wherein the moisture permeable portion is provided on a portion of a bonding surface of the protective plate, the bonding surface being bonded to the channel substrate.

25. (previously presented): The liquid-jet head according to claim 22, wherein the moisture permeable portion is provided on an upper surface of the protective plate.

26. (currently amended): The liquid-jet head according to claim 24 ~~or 25~~, wherein the moisture permeable portion is formed of an adhesive having a water permeability higher than that of an adhesive which constitutes the adhesive layer.

27. (previously presented): The liquid-jet head according to claim 22, wherein the moisture permeable portion is formed of a potting material.

28. (previously presented): The liquid-jet head according to claim 22, wherein the moisture permeable portion is provided in a region on a side of the piezoelectric-element-holding portion opposite the flow passage.

29. (currently amended) The liquid-jet head according to claim 22, wherein the moisture permeable portion is provided on the protective plate in each of regions outside the opposite ends of the row of pressure generation chambers.

30. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to any one of claims 1 to 29.

31. (previously presented): A method of manufacturing a liquid-jet head, comprising the steps of forming piezoelectric elements, each of which is composed of a lower electrode, a piezoelectric layer, and an upper electrode, on one surface of a channel substrate via a vibration

plate, the channel substrate having pressure generation chambers formed therein and communicating nozzle orifices for discharging liquid droplets; forming an upper-electrode lead electrode extending from the upper electrode of each piezoelectric element; forming an insulating film of an inorganic amorphous material over the entirety of a surface of the channel substrate, the surface facing the piezoelectric elements; and patterning the insulating film such that at least connection-wiring connection portions of the lower electrode and the upper-electrode lead electrode are exposed, and the insulating film is left in pattern regions of the respective layers of the piezoelectric elements and the upper-electrode lead electrode, except for the connection portion.

32. (previously presented): The method of manufacturing a liquid-jet head according to claim 31, wherein in the step of patterning the insulating film, a portion of the insulating film within a predetermined region is removed by means of ion milling.

33. (previously presented): The method of manufacturing a liquid-jet head according to claim 31, wherein the method includes, after the step of patterning the insulating film, a step of bonding a protective plate to a surface of the channel substrate, the surface facing the piezoelectric elements, the protective plate including a piezoelectric-element-holding portion for protecting the piezoelectric elements and a flow passage for liquid to be supplied to the pressure generation chambers, wherein in the step of bonding the protective plate, an adhesive is applied to the protective plate such that a space portion is left in a portion of a region surrounding the piezoelectric-element-holding portion, except for a region located on the side toward the flow passage, the protective plate is bonded to the channel substrate, and the space portion is sealed by a material having a water permeability higher than that of the adhesive so as to form a moisture

permeable portion through which water within the piezoelectric-element-holding portion permeates.

34. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 2.

35. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 3.

36. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 4.

37. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 5.

38. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 6.

39. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 7.

40. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 8.

41. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 9.

42. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 10.

43. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 11.

44. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 12.

45. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 13.

46. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 14.

47. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 15.

48. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 16.

49. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 17.

50. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 18.

51. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 19.

52. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 20.

53. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 21.

54. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 22.

55. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 23.

56. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 24.

57. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 25.

58. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 26.

59. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 27.

60. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 28.

61. (previously presented): A liquid-jet apparatus characterized by comprising the liquid-jet head according to claim 29.